

REMARKS

Claims 1-20 are pending in the present application.

Claims 1, 2, 4, 7-9, 11, 14-16 and 18-20 are rejected.

Claims 3, 5, 6, 10, 12, 13 and 17 are objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form, including all limitations of the base claims and any intervening claims.

Reconsideration of the claims is respectfully requested.

35 U.S.C. § 103 (Obviousness)

Claims 1-2, 4, 7-9, 11, 14-16 and 18-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,560,951 to *Fütterer* in view of U.S. Patent No. 6,426,683 to *Gu et al.* This rejection is respectfully traversed.

In *ex parte* examination of patent applications, the Patent Office bears the burden of establishing a *prima facie* case of obviousness. MPEP § 2142, p. 2100-123 (8th ed. rev. 1 February 2003). Absent such a *prima facie* case, the applicant is under no obligation to produce evidence of nonobviousness. *Id.*

To establish a *prima facie* case of obviousness, three basic criteria must be met: First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference

(or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. MPEP § 2142 at p. 2100-124.

Independent claims 1, 8 and 15 each recite at least one inductance connected to an input or output of a SAW resonator and sized to approximately tune out a stray capacitance seen across the inputs or outputs within an equivalent circuit for the SAW resonator at a selected frequency. Such a feature is not found in the cited references, taken alone or in combination. *Fütterer* discloses inductors L4 and L5 connected across the ports of a SAW coupled to two emitter-coupled differential amplifiers operating in a push-pull manner. *Fütterer*, Figure 2, column 2, line 65 through column 3, line 4, column 4, lines 51–62. However, the balancing inductors L3 and L4 are not employed to tune out stray capacitance as recited in the claims, but are instead employed for impedance matching with the 3dB coupler and amplifier:

When the input and output ends and the second and third terminals b, c of the 3dB coupler are match-terminated, a phase shift of 90 degrees occurs between the input terminal a and the output terminal b with a damping of 3dB; a phase shift of 0 degrees occurs between the input terminal a and the output terminal c with a damping of 3dB, and between input terminal a and output terminal d a substantial damping (20 dB decoupling damping) takes place. Next, through the coupling capacitors C8 and C9, the second and third terminals of the 3dB coupler are connected with an additional network whose impedance can be regulated by a control voltage applied from outside, so that there is no matched termination at the second and third connection points of the 3dB coupler and consequently, through a changed reflection of the input signal, a signal is generated whose amplitude is independent of the control voltage, but whose phase changes with the control voltage. . . . The other input terminal is connected to the reference potential; the first and second input terminals being connected through a resistance Z, with a value corresponding

to the characteristics of the 3dB coupler or impedance of about 75 ohms, and through a first balancing inductance L4. Likewise, the two output terminals of the surface-wave transmission line are connected with one another through a second balancing inductance L5. The need for these balancing inductances arises from the strongly capacitive input and output impedances of the surface-wave transmission line. The output terminals of the surface-wave transmission line, at which the output signal is in push-pull, are connected with the base terminals of the first and second transistors T1, T2 of the amplifier V. Through the construction selected, both the amplifier and the 3dB coupler are match-terminated.

Fütterer, column 4, lines 26–41 and 51–62. However, the capacitive component of the impedance seen at the input and output ports of the SAW device in *Fütterer* will not be limited to the parasitic or stray capacitances, but will also be based in part on the reactance of the SAW device's equivalent circuit within the selected operating frequency range. Inductances L4 and L5 will not inherently tune out the stray capacitances at the selected operating frequency. In order to gain access to the equivalent circuit at a desired frequency, the parasitic or stray capacitance must be negated or tuned out for that frequency. Too small of an inductance will result in stray capacitance remaining. Too large of an inductance will create an inductive barrier to access to the equivalent circuit in place of the capacitive barrier created by the stray capacitance. Moreover, at different frequencies, the inductance required will differ. The inductance must therefore be selected based on the stray capacitance at the desired frequency. *Fütterer* does not mention stray or parasitic capacitance, or tuning such capacitance out at a desired frequency.

Gu et al discloses a filter having a plurality of series-connected SAW resonators for which the input/output parasitic capacitances 60, 64 are reduced by inductors 65, 67 in order to reduce return losses:

Stray or parasitic capacitances may occur as 60 through 64 and are illustrated as a lump component. Generally, intersection parasitic capacitances 61, 62, and 63 can be absorbed into the design of integrated filter 51, but input parasitic capacitance 60 and output parasitic capacitance 64 cannot be absorbed into the design. Input parasitic capacitance 60 and output parasitic capacitance 64 are each about 0.5 pF and result in a return loss to integrated filter 51 of only 7 dB at the beginning of the passband. This performance is clearly not acceptable.

An input electrical component 65, which in this specific embodiment is an inductive coil but which may be any of an inductive coil, a section of transmission line, a series tuned circuit, and a parallel tuned circuit, has one end connected to an input terminal 66 of filter circuit 50 and the other end connected to a common potential, such as ground. Similarly, an output electrical component 67, which in this specific embodiment is an inductive coil but which may be any one of an inductive coil, a section of transmission line, a series tuned circuit, and a parallel tuned circuit, has one end connected to an output terminal 68 of filter circuit 50 and the other end connected to a common potential, such as ground. The input and output electrical components 65 and 67 are connected in parallel with the input and output parasitic shunt capacitances 60 and 64, respectively, so as to reduce the input and output parasitic shunt capacitances. As a result of the incorporation of input and output electrical components 65 and 67, the return loss of filter circuit 50 is improved to at least 16 dB within the passband. Here it should be noted that, if needed, additional electrical components, similar to those described above, can be used to reduce parasitic shunt capacitances (or other parasitic shunt elements).

Gu et al, column 4, line 51 through column 5, line 17. *Gu et al* does not describe or suggest negating the parasitic capacitance, which would require precise selection of the inductance of inductors 65 and 67 based on the value that stray capacitance and the desired operating frequency. *Gu et al* does

not enable such selection of inductance. Nor does *Gu et al* suggest that the parasitic capacitance be eliminated to provide access to the series resonant circuit of the SAW resonator for tuning.

Independent claims 1, 8 and 15 each further recite a variable tuning capacitance connected in series with the one or more inputs or outputs of the SAW resonator, the tuning capacitance capable of being employed to alter a resonant frequency of the SAW resonator circuit comprising the SAW resonator, the at least one inductance, and the at least one tuning capacitance. Such a feature is not found in the cited references. Capacitance diodes D1 and D2 in Figure 2 of *Fütterer* are simply switching elements having a “hyper-abrupt characteristic” (i.e., sharp turn-on/turn-off switching) to produce the desired rectangular waveform, and are not shown or suggested to have a variable capacitance that may be altered to adapt a resonant frequency of the overall circuit. The series-connected voltage variable capacitors (VVC) 57 in *Gu et al* are connected in parallel with the series-connected SAW resonators 52-55, and adapt the resonant frequency of the overall filter circuit 51, which is a complex function of the harmonic frequency for the SAW resonators 52-55, the VVCs 57, the coils 58, and the parasitic capacitances 60-64, rather than just the harmonic frequency of the SAW resonators, the VVCs 57 and the inductors 65, 67.

Therefore, the rejection of claims 1–2, 4, 7–9, 11, 14–16 and 18–20 under 35 U.S.C. § 103 has been overcome.

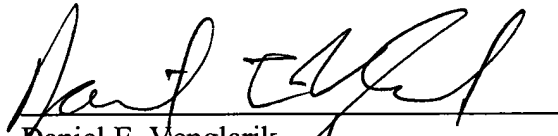
If any issues arise, or if the Examiner has any suggestions for expediting allowance of this Application, the Applicant respectfully invites the Examiner to contact the undersigned at the telephone number indicated below or at *dvenglarik@davismunck.com*.

The Commissioner is hereby authorized to charge any additional fees connected with this communication or credit any overpayment to Deposit Account No. 50-0208.

Respectfully submitted,

DAVIS MUNCK, P.C.

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Daniel E. Venglarik
Registration No. 39,409

P.O. Drawer 800889
Dallas, Texas 75380
(972) 628-3621 (direct dial)
(972) 628-3600 (main number)
(972) 628-3616 (fax)
E-mail: *dvenglarik@davismunck.com*